When Can AAAs With Necks >35mm Be Effectively and Durably Treated By EVAR: Tips and Tricks for Doing So

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President Trump has stated many times, “preventing leaks is easy…”

Disclosures:
• None

Endovascular Aneurysm Repair (EVAR)
• EVAR has become the preferred treatment for AAA
• Indications for use have expanded with progressive improvements:
  – active fixation
  – technology & imaging
  – delivery systems
  – physician experience
• Despite this, arguments for and against EVAR in unfavorable anatomy have been ongoing for 2 decades

Anatomic Limitations for EVAR
• Endograft advancements include the development of large diameter devices
  • US devices:
    – 36 mm: Cook Zenith
    – 36 mm: Medtronic Talent & Endurant II
    – 35 mm: Gore Excluder
  • Since obtaining FDA approval, large devices have been increasingly used to treat hostile aortic necks (not just wide)

Achilles’ Heel of EVAR- Infrarenal Aortic Neck
• ≥35% patients undergoing EVAR have adverse anatomic neck characteristics:
  – Length <10-15 mm
  – Diameter >28 mm
  – Angle > 60°
  – ≥50% thrombus or calcification
  – Reverse taper
• Skepticism exists about the use of large and/or oversized devices placed in hostile necks (out side of the IFU)
Critical Issue: Diameter & Proximal Neck Morphology are predictive of adverse events

- Flared
- Parallel
- Barret
- Cone
- Irregular
- Hourglass

Introduction

A meta-analysis of outcomes of endovascular abdominal aortic aneurysm repair in patients with hostile and friendly neck anatomy

- Ample evidence exists linking hostile aortic necks to unfavorable EVAR outcomes
- However, increased physician experience, improved device technology, development of adjunctive devices have challenged these results

Cook Zenith Flex 36 mm Aortic Endovascular Graft

- 2006, FDA approved Cook Zenith 36 mm device
- Data from Australian clinical study and Cleveland Clinic IDE
- 41 device implants (neck diameters 29-32 mm)
- 12 month results:
  - No aortic related deaths
  - No type Ia endoleaks
  - No device migration (>10mm)
- 36 mm device results are comparable to the US Clinical trial for 22-32 mm devices

Cook Zenith Flex 36 mm Aortic Endovascular Graft

- Data from 3 high volume centers in Netherlands 2008-2012
- Comparison infrarenal necks <30 mm (n=353) v. ≥30 mm (n=74, 17.3%)
- 1° endpoint- freedom neck-related adverse events Endurant stent graft
  - Median follow-up 4.1 and 3.1 years
  - Neck range 31-34 mm
  - Median oversizing 16.6% v. 12.5% (P<.001)

4 year freedom from neck related adverse events were 75% and 95% (P<.001)

Multivariate regression, necks ≥30mm independent risk factor for adverse events [OR 3.8, 95% CI, 1.6-9.1]

Stent graft oversizing:
- 26 patients had stent graft oversizing ≤10%
- Not related to adverse events

3 European vascular centers
- 1,331 elective EVAR/118 enrolled (9%)
- Midterm outcomes
  - EVAR in large ≥28mm necks
  - Mean neck 29.7±1.7mm (28-36mm)
  - 24 (20%) treated outside IFU
- 1° midterm endpoint- type Ia endoleak, freedom from re-intervention, ARM
  - Follow-up 37.9±11.9 months
  - Mean oversizing 17%±9%
  - 12% (14) Type Ia endoleak rate
c - caused 4 deaths
- 7% proximal neck re-intervention
- 3% ARM
- Survival 3 & 5 years: 89% v. 70%
- Aortic wall degeneration and disease progression occurred in large neck EVARs
Can large neck aneurysms (>35mm) be effectively and durably treated by EVAR?

**Probably not**

**Tips and Techniques**

- **Tip:** Avoid treating 35 mm necks with standard EVAR:
  - Increased neck-related adverse event rate
  - Limited device oversizing (1-7%)

- **Suggestion for elective cases:**
  - Fenestrated or branched EVAR
  - chEVAR
  - Conventional open repair

**Tips and Techniques: Basic Techniques for “Emergent Large Neck Cases”**

1. Long parallel infrarenal neck
2. Maximize landing zone
3. Normal pararenal aorta
4. 36 mm EVAR with active suprarenal fixation
5. Endoanchors

**Tips and Techniques: Adjunctive Techniques for “Emergent Large Neck Cases”**

1. EVAR and parallel grafts:
   - PERICLES registry: Comparable outcomes to FEVAR
   - Off-the-shelf option, immediately available alternative for complex EVAR
2. EVAR and endoanchors:
   - ANCHOR registry: Freedom from type Ia endoleak 95% at 1 year
   - Endoanchors with Heli-FX endoanchors approved for short and angulated necks (not large necks)
   - Anchors are an effective adjunct to prophylaxis against proximal neck complications
3. EVAR and external aortic wrap

**Conclusion**

- Large aortic necks represent an advancing state of aortic wall degeneration
- Early follow-up suggests that large EVAR devices used within the IFU are effective
- Mid-term clinical evidence opposes the use of EVAR in large diameter necks
- Consider using standard EVAR to treat large aortic necks only in urgent and/or high surgical risk cases (if FEVAR unavailable)
Thank you